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The Bradshaw lecture on vesical stone an

The Bradshaw Lecture

ON

CAL STONE AND PROSTATIC DISORDERS.

Delivered before the Royal College of Surgeons of England on Dec. 9, 1896

BY

REGINALD HARRISON, F.R.C.S. Eng.,

MEMBER OF COUNCIL; EX-VICE-PRESIDENT, AND FORMERLY HUNTERIAN
PROFESSOR OF PATHOLOGY AND SURGERY, ROYAL COLLEGE
OF SURGEONS OF ENGLAND; PRESIDENT OF THE
MEDICAL SOCIETY OF LONDON.

Reprinted from THE LANCET, December 12, 1896.

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VESICAL STONE AND PROSTATIC DISORDERS.

GENTLEMEN,—We are met by reason of the beneficence of the widow of the late Dr. William Woods Bradshaw, a physician who practised first at Andover and subsequently at Reading and who was a Fellow of this College, for the purpose of endeavouring to promote in one direction or another the scientific objects for which this College was originally founded. I shall best mark our respect to the memory of the founder of this lectureship and my appreciation of the honour conferred upon me by at once proceeding to attempt to discharge the duty I have thus undertaken. If, for any purpose, we look at the surgery of to-day as exemplified, for instance, by the work of many of those who either have been or are associated with this college and compare it with what existed at the commencement of this century or even later, it is impossible not to recognise the marvellous progress that has been made all along the line. Though in some directions it may be more apparent or practical than in others, yet it is at once obvious that it is the outcome of the development of principles which are applicable not merely to subdivisions artificially arranged for convenience of study or of practice, but to the whole field over which the science and art of surgery may be said to range. It will be my endeavour in noticing certain advances that have taken place in work which circumstances have brought more immediately under my notice to give prominence to some aspects of a large and an important subject which appear to deserve further consideration and expansion. In this way I venture to hope I shall best fulfil the objects entertained by the beneficent founder of this lectureship.

CHANGES IN PRACTICE.

In bringing under your attention some points connected with the surgery of the urinary organs it is impossible to refrain from noticing the important changes that have taken place in the operative treatment of the affections of these parts within the recollection of most of us present on this occasion. Lateral lithotomy has practically disappeared from the scene, suprapubic and perineal cystotomy, more especially in their application to calculus, have undergone important modifications and have been revived, the older methods of removing stone from the bladder by crushing have been supplanted by Bigelow's process of litholapaxy, and the surgery of the kidney with the various methods this includes,

now occupies a permanent and prominent position in our textbooks. Nor is it improbable that the range of renal surgery may not be still further extended with advantage. The outcome of these changes in, and additions to, our methods of dealing with urine stones alone represents a saving of life and suffering which would be difficult, if not impossible, to estimate by figures.

LATERAL CYSTOTOMY.

The almost entire disappearance of lateral cystotomy, using this term in its more extended application to various affections and injuries of the urinary apparatus, is a turn of affairs which I venture to think cannot be viewed entirely with satisfaction. Some of us may remember how marvelously this operation was utilised by the late Sir William Fergusson for the rapid and successful removal of certain forms of stones from the bladder. It was in this theatre and before a distinguished audience of the kind gathered here to-day that he referred to this process in terms of eulogy as "the master handiwork of surgery." In thus dissenting from the tendency existing at the present day to relegate lateral cystotomy to the surgical shelf, the suggestion comes to me in a measure from reading some remarks in a review relative to certain observations of which I happened to be the author, where I was rather severely taken to task for being so old-fashioned or so eccentric as to reproduce for the use of my readers, at the close of the nineteenth century, a somewhat carefully prepared description of this operation. It seemed to me that such a criticism was a little premature, for though the use of this operation in stone cases was daily becoming more restricted by reason of the substitution of other methods, the fact that lateral cystotomy possessed essentials in treatment peculiar to itself must for ever command for it a place in the records of operative surgery. By what other means that have yet been devised, may I ask, can a surgeon by an opening from the perineum in the male secure the removal of a stone and the dependent drainage of a diseased and incontinent bladder without the use of apparatus, together with the necessary infliction of a wound on the prostate which there are reasons for thinking has not unfrequently been the means of arresting its growth, if not of inducing its atrophy when enlarged? Nor can it be doubted for the reasons just assigned that in certain forms of injury involving the neck of the bladder, complicated as this sometimes is with fracture of the bones constituting the pelvic arch, as in instances of extra-peritoneal rupture of the bladder, an incision as for lateral cystotomy has frequently been the means, by at once establishing free and untrammelled drainage for the urine, of alone bringing about a successful termination to the case. For reasons such as these I should be sorry to think that the mode of performing lateral lithotomy has either ceased to be taught in our schools or to be tested by our examiners.

SUPRAPUBIC CYSTOTOMY.

Lateral cystotomy has to a large extent been displaced by the revival of the suprapubic or high operation on somewhat altered lines, and with this substitution I am not disposed to find fault. By this method an easy access to the bladder for the purposes of exploration and drainage not requiring a dependent opening, for the removal of growths from the interior of this viscus as well as pendulous excrescences from the prostate, is provided. In the case of small stones, both in the adult and the child, its substitution for crushing in uncomplicated cases is often unnecessary, whilst in the instance of very large calculi, though no other course may be open to the surgeon, the risk to life, it must be remembered, is considerable. Time, however, will not permit me to traverse opinions and practices relative to an operation which has undoubtedly justified its revival and has proved of much service in connexion with the general surgery of the bladder. Its selection relative to the treatment of stone will be found mainly to turn on individual experience rather than upon those hard-and-fast lines which lecturers are sometimes disposed to lay down.

LITHOLAPAXY.

Turning to the crushing operation for stone as now generally practised on the lines laid down by Bigelow in 1878, we shall find much connected with it of interest to discuss without encroaching upon historical and personal controversy. There can be no doubt whatever that the anticipation expressed by the author of the term "litholapaxy" as to the crushing and evacuation of stone from the bladder by an uninterrupted and completed process with hardly any reference to its size or constitution, being followed by a largely diminished mortality, has been more than realised. In connexion with Bigelow's method of operating I may perhaps be excused in saying what pleasure it afforded me in being present at the Massachusetts General Hospital, and witnessing some of the cases which formed the earliest portion of the important series that Bigelow subsequently published¹ in illustration of his work. The instrument I am showing you is one of his original evacuators with the catheters which I brought over with me from Boston in 1878, and subsequently used. I do not, however, think it would be right in thus alluding to the greatly diminished mortality that has followed successive improvements in the crushing operation for stone, or by whatever other name we may call this proceeding, were I to omit to refer to the impetus given to this direction of work by Civiale and Guyon in France and by Sir Henry Thompson in this country. By the latter the Museum of this College has been greatly enriched by his gift of a collection of calculi which is unique in its extent and clinical history.

¹Litholapaxy. W. Wood and Co. New York, 1878.

whilst our library and our literature have largely profited by his pen.

RECURRING STONE.

I must, however, turn, as I have already indicated, to another aspect of my subject. In his Hunterian lectures, delivered before this College in 1886, Mr. Cadge observed that "although the immediate and direct mortality of lithotripsy is small the recurrence of stone is lamentably frequent." In illustration of this statement he referred to figures which indicated this as then amounting to about one in seven. It must, however, be remembered that this calculation was based to a considerable extent upon cases operated upon by the processes of crushing with very imperfect means of artificially evacuating the fragments from the bladder which preceded Bigelow's time. A decade has now elapsed since this criticism was offered, and without troubling you with figures which might be open to objection for this purpose if not drawn from sources in actual parallelism with those which formed the basis for the conclusion Mr. Cadge arrived at, there can be no doubt that within this period and directly arising out of the further development and more general adoption of Bigelow's work the liability to recurrence after these operations has greatly diminished. Improvements in the construction of lithotrites or breaking machines so far as relate both to trituration and speed, the more general substitution of fenestrated for smooth-bladed instruments, the use of evacuating cannula permitting of the more ready withdrawal and escape of the broken-up fragments from the bladder, and the employment of aspirators or wash bottles more capable of sluicing the bladder and any irregular pouches it might possess, are the means which have chiefly contributed towards this end.

PROSPECTIVE ADVANCES.

It would be an interesting study, and not without some prospect of promoting further developments in this direction—to trace, if occasion permitted, the various advances that have been made from time to time in the construction of the mechanical appliances used in crushing and evacuating stone in the bladder. I am disposed to think, however, that in the further application of chemistry and physics in this direction—I refer more particularly to the extension of such investigations as Rainey's on Molecular Coalescence relative to the Formation of Calculi—to all forms and positions of urine stones that further improvements in practice will eventually come. My reasons for thus venturing an opinion on this point are mainly based on the assumption that such investigations as I have just referred to describe the mode in which calculi are built up in the human species by an exact and unvarying process which is capable of being imitated in the laboratory. Or, as Rainey observes, "there seems to be no reason why this explanation of the formation of these

urinary calculi by molecular coalescence should not be regarded as the correct one." Thus may we hope eventually to learn to interpose conditions artificially, which, being at variance in some degree with a formative act, necessarily render the completion of a stone-producing process abortive. In the more methodical study in relation to their control, of the forces which make cohesion of certain natural products of the body possible or impossible, further advances may be hoped for in these directions.

CAUSES OF STONE RECURRENCE.

Reverting to stone recurrences it must still be recognised that even with the best appliances and skill they not unfrequently occur, and it is to such instances in relation more particularly to some recent investigations in collateral directions I would desire now to direct your attention for a few moments. If we analyse the causes of stone relapses after crushing operations there can be no doubt that a failure to remove all the fragments from the bladder in the first instance is by far the most frequent one. It is in reference to this very important matter that lithotomy, however performed, irrespective of the question of mortality, shows to an advantage and at the same time suggests an explanation why this distinction should exist. This is a point which I think requires further analysis and consideration. The general experience of crushing operations as now and for some years past almost universally practised under the name of "litholapaxy," in this country at all events, seems to indicate sufficiently clearly that the liability to recurrence after this operation increases considerably as age advances. Recurrences before sixty years of age are rare, and are usually traceable to some exceptional circumstance, such as urethral stricture or obstruction attended with pouching or trabeculation of the bladder; hence we may conclude that hypertrophy of the prostate and the structural complication arising out of this in conjunction with atony or imperfect powers of urine expulsion are frequent concomitants in by far the larger proportion of stone relapses after lithotomy. This is the view which I believe now finds general acceptance. This explanation, of course, applies only to those instances of recurrence where the calculus is mainly phosphatic and of vesical origin, in contradistinction to those where a fresh descent from the kidney takes place, and accidental arrest and growth in the bladder secondarily ensues. Instances are occasionally met with where the operation of crushing has been followed within a few days by an attack of renal colic. Here a diathetic stone is either spontaneously expelled in the course of normal micturition or, being too large to get over the bar caused by an enlarged prostate, requires pulverising with the lithotrite before its evacuation can be effected. In cases where persons have been in the habit of passing renal calculi for years it is frequently found when the

prostatic age is reached that the ureters, no doubt much dilated by previous attacks, allow stones of considerable size to descend into the bladder comparatively painlessly, which are subsequently trapped by the enlarged prostate. Otherwise they might, as previously, have been spontaneously voided. Recalling, however, the ordinary circumstances under which stone recurrences after lithotripsy most frequently occur I am brought to consider, not the necessity for imposing other restrictions upon the employment of an operation by means of which so much has been achieved at so small a risk to life, but how far progressive surgery permits us to remove or mitigate complications in structural defects which tend to provide mechanical difficulties, sometimes insuperable, in the way of complete evacuation of the fragments and subsequently furnish favourable conditions for repeating the process of stone-making when once the nucleus is there.

TREATMENT OF ENLARGED PROSTATE.

We may therefore proceed to inquire—(1) what means have we, if any, of diminishing the enlarged prostate; (2) to what extent are they applicable to cases complicated with recurring vesical stone; and (3) what alternative measures have we for litholapaxy under exceptional circumstances of this nature. If the question were put to a student under examination, What surgical measures have been followed by atrophy or shrinkage of the hypertrophied prostate? I think he would be justified in replying somewhat in this way—It has followed cases of simple incision into the prostatic ring as in the second stage of lateral lithotomy. It has supervened upon puncture of the bladder through the enlarged prostate with retention of the cannula for some weeks.² Shrinkage of the enlarged prostate has followed upon double and single castration and upon double and single vasectomy or division of the vas deferens. This answer would of course not be regarded as including cases of partial or complete removal of the prostate gland now known under the name of prostatectomies. The second question which necessarily arises out of the preceding statement—namely, how far these several methods of inducing shrinkage or inactivity are applicable to cases of hypertrophied prostate complicated with recurring vesical stone, is not so easily or so briefly answered and will, for the latter purpose, require some expansion. Prostatic incision, or puncture as first referred to, apart from the limited nature of the observations where atrophy seems to have followed them, would hardly be applicable in cases otherwise suited for lithotripsy. I will, therefore, without further comment, pass on to notice the adoption of castration and vasectomy in respect to the object now under review.

² Surgical Disorders of the Urinary Organs, by Reginald Harrison, fourth edition, p. 276.

CASTRATION FOR ENLARGED PROSTATE.

Reference to these proceedings opens up a subject which so far as it relates to the practice of surgery is new, though from an anatomical and physiological aspect it has previously received some attention which must not be entirely overlooked. John Hunter³ appears to have experimented on animals in reference to this point, and more recently Griffiths⁴ has added importantly to these researches. Decimus Hodgson⁵ of Glasgow wrote in 1856 "in persons who have been castrated the prostate dwindles down almost to a rudimentary condition." The inference, however, that what is true relative to the normal state of these parts also applies in varying degrees to the hypertrophied prostate does not appear to have been utilised systematically for practical purposes until Dr. William White of Philadelphia drew attention to it in 1893.⁶ Since this paper appeared the operation of castration and other proceedings arising out of the same train of thought relative to the enlarged prostate have been somewhat extensively employed, and to some of the results obtained and the considerations suggested I purpose now referring. From the records of this operation, now amounting to several hundred cases, which from time to time have been drawn up by various surgeons I do not think there can be any doubt in arriving at the conclusion that in a certain proportion of cases castration has undoubtedly been proved to have been speedily followed by shrinkage of the large prostate and abatement of the symptoms attending this condition. Taking one of the most recent communications on the subject of which Dr. Cabot⁷ of Boston is the author and which includes about 100 well authenticated cases in illustration, on reading it I was struck not so much with the somewhat high death-rate, but with the uncertainty as to the kind of result, physical as well as mental, the surgeon is likely to expect. Will the patient recover completely or imperfectly when the risk of the operation is passed, whatever this may be, are questions which naturally arise and are apparently at the present stage not very easy to answer. In the expression of opinion by Dr. Cabot that castration seems especially efficacious in cases of large tense prostates when the obstruction is due to the pressure of the lateral lobes upon the urethra and is of but little use in myomatous and fibrous glands, he is warranted, I consider, by the records to which I have referred.

I have hitherto been addressing myself more particularly to the application of castration to prostatic hypertrophy generally. Scattered, however, through the cases which have been recorded are some few where it has been utilised for recurrence of stone after crushing

³ Works edited by Palmer.

⁴ *Journal of Anatomy and Physiology*, vols. xxiii. and xxiv.

⁵ *On the Prostate Gland*. Churchill, 1856.

⁶ *Transactions of the American Surgical Association*, 1893 and 1895.

⁷ *American Surgical Association*, May, 1895.

operations with advantage, where this complication was prominent. I cannot quote a case of my own in illustration, as I have not had occasion to resort to it under these circumstances, but I am acquainted with one where it well served this purpose. It was that of a male seventy years of age who had stone recurrence after lithotripsy on three occasions at intervals of a year or so. On the fourth time of relapse the urine and bladder were in so foul a state from cystitis and great enlargement of the prostate that a suprapubic cystotomy was performed by means of which a phosphatic stone was again removed and the bladder was drained for some time. The patient, however, was intolerant of all the methods that were tried with the object of keeping the wound open by various drainage appliances, and eventually it closed before the latter process was completed. This was followed by a speedy return of all the symptoms of cystitis and the commencing formation of more phosphates. To meet this condition the bladder was again cleared by means of the lithotrite and the aspirator and double castration was performed. The relief was now complete, and is, I believe, permanent, as the patient has been free of his stone and his symptoms for nearly two years and has no need either of his catheter or his irrigator. It is under circumstances such as these that castration may occasionally find a place in the treatment of recurring stone complicated with enlargement of the prostate. In selecting it, however, apart from other considerations, the surgeon must be reasonably clear in his opinion that the case is not one either of encysted or pouched stone; otherwise, as castration affords no opportunity of making either a digital or ocular examination of the interior of the bladder, a suprapubic prostatectomy would, in the face of these presumed complications, be preferable.

VASECTOMY FOR ENLARGED PROSTATE.

After reading Dr. White's first paper, to which I have already referred, I took an early opportunity of raising the question as to whether somewhat similar results so far as the enlarged prostate was concerned could not be induced by dividing either one or both of the excretory ducts of the testicle. I based my suggestion partly on a case⁸ where I had casually, though at the urgent desire of a patient, divided the vasa some years previously (under somewhat exceptional circumstances which I narrated) with good results continuing over a considerable period of time. Further, I drew attention, in connexion with the subject of injuries to the vas deferens, to certain cases recorded by Hilton and Birkett⁹ where atrophy of the corresponding testis was proved to have followed the accidental division of this tube either by section or laceration. My contention was that if division of a vas brought about atrophy of the corresponding testis it was logical to

⁸ Brit. Med. Jour., Sept. 23rd, 1893.

⁹ Holmes's System of Surgery, first edition, vol. ii., p. 739.

conclude that the remote effect on the prostate would be the same as if the testis had been actually removed. That is to say, the division of one vas should be followed by unilateral atrophy, first of the testis and afterwards of half of the prostate. Whereas if both vasa were divided both testes and the whole of the prostate should subsequently undergo shrinkage. I think I may claim that this has now been demonstrated to be the case. It must, however, be stated that one of the objections I have put forward against castration, as matters at present stand, applies with equal force to vasectomy. I refer to the uncertainty that exists as to what kind of results will be obtained. In the course of a discussion that recently took place¹⁰ in reference to the treatment of prostatic hypertrophy by these means I took the opportunity of saying that from some experience of my own the results of vasectomy depended very much on attention to certain details connected with the operation which I ventured to enumerate, and which I will briefly repeat. In the first place I do not think it is well to operate on both vasa at the same time, as any risk connected with the proceeding is increased and mental effects of a serious nature may follow such as have been observed after castration. I have not met with an instance where any ill effects resulted when a sufficient interval was allowed to elapse between the two operations. I think the interval should be not less than a month. I have seen instances where the relief following the division of one tube was so sufficient as to render division of the opposite one unnecessary. In some of my cases I found that after one vas had been divided the prostatic symptoms subsided at once, and then after an interval of three weeks or so began to re-appear coincidentally with some hypertrophy of the testicle of the opposite side where the tube had not yet been divided. The second operation was then proceeded with and it was in the group of cases where this incident was observed that I obtained the most satisfactory results. It must, however, be remembered, as I have endeavoured to put it, that in bringing about prostatic atrophy or inactivity by section of the ducts it is through the medium of a double process, or, rather, by the induction of an atrophy by an atrophy. Hence the effects of vasectomy upon the prostate are longer delayed and more gradual than when the testes are primarily removed. In some of my cases of double vasectomy it was observed, though in all instances the effects were properly explained to the patients beforehand, that the division of these ducts was not immediately followed by cessation of sexual desires, and months sometimes elapsed before these sensations finally ceased and atrophy of the testes was marked. I am not aware, however, of an instance where these effects, though delayed, were not finally attained. Though vasectomy must be regarded as a slower process than castration relative to

¹⁰ Brit. Med. Jour., Oct. 10th, 1896.

prostatic changes, in this I believe lies its comparative safety and advantage. In the next place, a portion of the vas must be resected and not merely ligatured. Pavone,¹¹ who has recently reported twenty-eight cases out of thirty-four where the patients were either cured or improved after vasectomy, advises that in addition to excision the ends of the canal should be twisted so as to ensure complete closure. The possibility of the restoration of the occluded vas when a ligature only has been used had been illustrated by Dr. Bransford Lewis.¹² Here on the return of prostatic symptoms it was found that the continuity of the duct had been re-established after the ligature had come away. The simplest way of performing the operation seems to consist in exposing the vas by a short linear incision over it and protruding it between the finger and thumb. An aneurysm needle is then slipped under the isolated duct by means of which a loop about an inch in length is withdrawn. The latter is then included in a silk ligature when the free portion is removed by scissors. The small wound usually heals quickly. Apart, however, from some failures arising from want of attention in operating to details such as these there appear to be other reasons requiring consideration and which apply with equal force both to castration and vasectomy. I have already stated that where the prostate has passed into a fibrotic condition or where the obstructing third lobe represents in structure a fibrous tumour the prospects following either operations on the sexual apparatus are unpromising. Here McGill's operation is usually indicated. There are, however, other conditions of the prostate which must be taken into our reckoning. I am inclined to believe that if the consideration and discussion of these two operations relative to prostatic hypertrophy did no more than lead us to reconsider many points connected with the pathology of this part much will have been accomplished. I have long thought that slowly progressive carcinoma of the prostate, resembling in some features the more ordinary forms of hypertrophy, is far more common than is generally believed to be the case. My attention was first called to this matter in 1886, when I recorded a case¹³ which I will briefly refer to. It was that of a man aged fifty-nine years who as a private patient I had the opportunity of watching for two years up to the time of his death. In the first instance he suffered from some irritability of the bladder, which he could not completely empty. He was losing flesh, becoming pale, and though the mental faculties remained vigorous to the last he constantly complained of pain in the loins, nates, and thighs. In the course of a few weeks he became entirely dependent upon the catheter. His prostate as felt from the rectum was hard, nodular, and almost insensitive to the touch, though it was not much enlarged nor were any neighbouring glands

¹¹ Il Policlinico, No. 15, 1896.

¹² Journal of Cutaneous and Genito-Urinary Diseases. New York, 1896.

¹³ Op. cit., p. 509.

found to be involved. As his general health slowly declined minute petechial spots appeared on various parts of his body and his feebleness gradually increased. Occasionally he passed a small quantity of blood with his urine. He appeared to die from exhaustion, the result of prolonged blood vitiation. After death his prostate was examined by Mr. F. Paul, who reported it to be an unmistakable example of carcinoma. There was no evidence to show that this was other than the primary disease. I remember Mr. Paul remarking to me at the time, that the precise nature of the disease would probably have been undiscovered had it not been carefully looked for, as there was, apparently to the naked eye, but little to distinguish the specimen from ordinary hypertrophy. I have since met with many instances of this kind in practice and have been able occasionally to confirm the diagnosis by pathological examination. Clinically this group of slowly progressive carcinomata may be distinguished by the following indications. In the first place they are generally met with in persons who are rather under what I would speak of as the prostatic age—that is to say, they chiefly occur in males of fifty-five or thereabouts. When felt from the rectum the gland is found unusually hard, bossy, and rather insensitive to the touch. They seldom bleed much or ulcerate unless damaged by a catheter or sound. Though the use of the former is generally required more or less constantly before the case terminates there is seldom either sudden or complete retention, or even distension of the bladder. Reflected pain in various parts such as the thighs, nates, and rectum is often complained of, in addition to much painful irritability of the bladder. Death is usually caused by blood vitiation and exhaustion, with well-marked signs of what we used to speak of as a cachexia. I have referred to fibrous and carcinomatous prostates for the purpose of remarking that for such growths as these neither castration nor vasectomy is at all likely to be of any avail. Together they represent a by no means uncommon condition of this part, and their treatment must be conducted on the principles which are applicable generally to growths involving the interior and neck of the bladder. In going over the recorded cases of castration and vasectomy it is not difficult, in reading between the lines, to see that amongst them are included instances of the two conditions to which I have just referred and where experience shows that no good was likely to accrue from what was done. These we must endeavour to exclude and then I think we shall find that division of the vasa deferentia will be found an efficient and fairly reliable means for relieving advanced forms of prostatic hypertrophy without incurring the additional risks, not to mention other drawbacks, which naturally attend such an operation as castration. I must not here forget to mention that I have in three instances employed division of the vasa in recurring stone with cystitis due to much enlargement of the prostate with great and I believe permanent advantage. Apart from the non-recurrence of the stone, after fair

intervals of trial a general improvement in the function of micturition has been maintained, and this is in correspondence with what other surgeons have illustrated in the records to which I have referred. I will very briefly narrate the particulars of one of these cases, as it illustrates several points referred to in connection with the subject of vasectomy. It was that of a gentleman aged 66, who, on developing an enlarged prostate, was unable to pass renal calculi composed of uric acid, and on two occasions in 1891 I had to crush these and remove them by the wash bottle. In the course of the following year he suffered much from cystitis, probably more connected with his prostate than with his calculous tendency. In 1892, when absent from London, his symptoms became so urgent that his medical attendant opened the bladder above the pubes, and removed a phosphatic concretion. Though this operation was thus far successful, the suprapubic wound remained permanently open until September of this year (1896). Though he did not develop more stone, his prostate and suprapubic fistula became a constant source of pain and annoyance to him. Early in 1894 he again came under my care for his urinary symptoms. The prostate was very large and hard, and there was a suprapubic fistula through which the whole of the urine passed, with the exception of a small amount which he drew off with a catheter. All kinds of expedients having failed to close the fistula, in January 1894 I opened it up and explored the bladder. There was no stone, but some mortar-like phosphates. The prostate was large, and the middle lobe prominent. I removed the latter, and, having freshened up the sinus, closed it with sutures, and retained a rubber catheter in the bladder along the urethra. However, no good came out of this, worth mentioning, and the patient's condition was, in the course of a short time, in no way improved. After again waiting and trying other means, with catheters and sutures, and having regard to the condition of the prostate as the primary cause of the fistula by obstructing normal micturition, in February of this year (1896) I resected one vas, and the other in the following May. By September, and without any other treatment, the fistula had permanently closed, and micturition was again normal, after an interval, to my knowledge, of over three years. This I found, by examination from the rectum and with a catheter, associated with a considerable diminution in the size and sensitiveness of the prostate. Additional interest is attached to this observation, as a partial prostatectomy, it will be remembered, was practised over two years previously.

It will be understood that the operative expedients I have drawn attention to as worthy of consideration are only applicable to grave varieties of prostatic disease, whether complicating vesical stone or not. When we recognise how considerable a proportion of well-matured brains carry on long and useful lives with advantage to those belonging to them as well as to the community at large, and who are more or less dependent upon the aid a catheter affords, it is unnecessary to say that such measures as those I have been

discussing can only apply in any degree to the exceptions and not to the rules. The latter are already, I believe, adequately provided for, whilst in the interests of the former all proved methods, either of cure or relief, must receive, as they always have done, our careful and unbiased consideration.

PERINEAL LITHOTRITY.

I will now pass on to offer some remarks in reference to perineal lithotripsy. Amongst the variations that stone cases present a small proportion will be met with where, by reason of the condition of the bladder and the urinary apparatus generally, the ordinary operation of crushing is not applicable. In these cases not only must the stone be removed, but provision made for the drainage of the bladder, and for the latter purpose lithotripsy in no way adequately provides. Where the stone is large—and I am speaking now of calculi between two and three ounces in weight—and the prostate and bladder more or less involved in supuration and chronic inflammation various substitute proceedings are adopted which have to be considered. Suprapubic cystotomy under these circumstances is attended with a high rate of mortality. Guyon and others have estimated it in males of advanced age, who are generally the subjects of these complications, at somewhere about 50 per cent., and my own impression is that this is about the case. Such a mortality as this takes us back to some of the worst days of lithotomy and contrasts unfavourably with other forms of suprapubic cystotomy, as, for instance, when applied to younger persons, and even with suprapubic prostatectomies which Mr. Mayo Robson¹⁴ has shown to be a much less risky proceeding. It is now some years ago since I had this point under careful consideration in connexion with one or two cases of septicæmia after lithotripsy arising under the conditions I have just referred to. On reviewing the various operations employed for removing stone from the bladder other than by crushing alone it appeared that there was much in Dolbeau's¹⁵ method of perineal lithotripsy to recommend it. The objections against it chiefly centred in the employment of forcible dilatation of the prostatic urethra and the neck of the bladder, and in the instruments used in crushing and evacuating the stone fragments. Further, no provision appears to have been made by Dolbeau for draining the bladder systematically after the stone had thus been withdrawn. These objections, however, seemed to be capable of removal and I proceeded to practise this operation from time to time, as suitable cases presented, in the following manner. In the first place an ordinary *boutonnière*, or median perineal cystotomy, is practised on a grooved staff sufficient to admit the introduction of the finger into the bladder as for digital exploration. This represents all the dilatation of the prostate or neck of the bladder that

¹⁴ Brit. Med. Jour., April 28th, 1894.

¹⁵ De la Lithotritie Périnéale. Paris, 1872.

is attempted. The next step is to withdraw the index finger and substitute a pair of crushing forceps specially made for this purpose, though in other respects resembling an ordinary pair of lithotomy forceps, either straight or curved. These have been constructed for me by Messrs. Krohne and Sesemann. They are made in different sizes, the most powerful having a screw at the handle by which the full crushing power is brought into play. In circumference the combined blades correspond in size with an average index finger, and contain, well within cover, a strong cutting rib running down the centre of each, by which the fragmentation of the stone or stones is chiefly accomplished. By means of these forceps the stone is sufficiently reduced in size as to be either easily withdrawn in fragments from the bladder by these instruments or to be sluiced out with a cannula and an ordinary wash-bottle as used for litholapaxy. Straight cannula such as these will be found the most convenient for this purpose. After the stone has been withdrawn and the bladder and prostate carefully examined either with the sound or the finger the drainage-tube is introduced and retained for as long as necessary in accordance with the nature of the case. Here is (showing a specimen of a stone) the hardest kind of urate, the fragments weighing over three ounces, which was broken up and withdrawn in this way in something like five minutes, a process which would have occupied an hour or more had it been expedient to substitute lithotripsy. I also removed with my finger quite easily a grape-like third lobe which was in my way. The patient made a rapid and complete recovery. From this it may be judged what these forceps are capable of effecting and what may be withdrawn through a wound although only sufficient in extent to admit the introduction of an index finger. I have in one or two instances tried a short lithotrite, such as Surgeon-Major Keith has described, passed into the bladder through the perineal wound, instead of by crushing forceps, but find the latter more effective and convenient for use in this position. I have selected this method in fifteen instances out of considerably over 300 cases of lithotripsy, and have so far had no deaths or recurrences of stone following it. The chief points in its favour are these: (1) It enables the operator to crush and evacuate large stones in a short space of time; (2) it is attended with a very small risk to life as compared with other operations, such as lateral or suprapubic lithotomy, and is well adapted to old and feeble subjects when for any reason crushing is inadmissible; (3) it permits the operator to wash out the bladder and any pouches connected with it more effectually than by the urethra, as the route is shorter and the evacuating catheters employed of much larger calibre; (4) the surgeon can usually ascertain, either by exploration with the finger or by the introduction of forceps into the bladder, that the viscus is cleared of all debris; (5) it enables the surgeon to deal with certain forms of prostatic outgrowth and obstruction complicated with

atony of the bladder in such a way as to secure not only the removal of the stone, but the restoration of the function of micturition; and (6) by the subsequent introduction and temporary retention of a soft rubber drainage-tube states of cystitis due to the retention of urine in pouches and depressions in the bladder wall are either entirely cured or are permanently improved. To lock up unhealthy ammoniacal urine in a bladder that cannot properly empty itself after a lithotomy is to court the formation or recurrence of a phosphatic stone. Hence it is well suited to some cases of recurrent calculus. I have never known the wound to remain unhealed except in those instances where, for some reason or other, it has been desired to construct a low-level urethra. It is well adapted for some cases of stone in the bladder complicated with stricture in the deep urethra, as it enables the surgeon to deal with both at the same time.

In a recent paper by Mr. Herbert Milton of Cairo¹⁶ I see that the operation of perineal lithotomy figures prominently and successfully amongst the 200 cases of stone he records. He has employed it much on the same lines as I have described in twenty-one instances with one death. Though speaking of Bigelow's operation as the more brilliant of the two he evidently has reason to regard perineal lithotomy as now revived as the more generally useful. A specimen made by Messrs. Down Brothers of the breaking forceps Mr. Milton employs is submitted for your inspection. Taking Mr. Milton's twenty-one cases and fifteen of my own we have a total of thirty-six with one death, which, considering the size of many of the stones and the complications that were present, gives, I think, a very satisfactory result and one that will compare favourably with other operations, either crushing or cutting, used in the treatment of stone. I have a growing impression that in countries where by reason of the great age that is often attained by persons suffering from stone in the bladder, and where the opportunities for practising lithotomy are not very frequent, perineal lithotomy will be more generally utilised.

RETENTION OF URINE AND IMPACTED CALCULUS IN CHILDREN.

Before leaving subjects connected with the treatment of vesical stone by crushing I would briefly allude to a change in practice for the better which is a direct outcome of the excellent work in the application of this operation to male children. I refer more particularly to the successful employment of lithotomy in this direction by our distinguished Fellow, Brigade-Surgeon-Lieutenant-Colonel Keegan—work which has been importantly supplemented by my colleague, Dr. Freyer.¹⁷

Sudden retention of urine in young males is most frequently caused, as we are all aware, by the impaction of a

¹⁶ THE LANCET, April 18th and May 2nd, 1896.

¹⁷ See Dr. Freyer's paper, published in this issue of THE LANCET p. 1672.—ED. L.

small stone in the urethra. Such an incident, apart from the extreme urgency of the symptoms thus produced, has not unfrequently led to ulceration of the urethra and serious, if not fatal, extravasation of urine into the neighbouring tissues. In fact, it may be stated, with hardly an exception, that it is under these circumstances alone such a calamity is met with in these young subjects. In earlier days, when the catheter detected that a stone was thus impacted, the practice universally was either to cut down and remove the calculus from the position it occupied in the urethra, or if possible to push it back into the bladder, and then to extract it by some form of lithotomy or cutting operation. Though either proceeding was usually successful it entailed an operation which necessarily required a period of convalescence to follow. Amongst some of my earliest lithotomies in male children were cases occurring under these circumstances. In illustration of the importance of this change in practice I may be permitted to mention, very briefly, the particulars of a recent case. It was that of a boy aged four years whom I saw with urgent retention of urine due to the lodgement of a stone in the urethra just behind the scrotum. I pushed the stone back into the bladder and the retention was at once relieved. On the following morning I had the child placed under an anæsthetic and crushed the stone. As I found at the moment I had not an evacuating catheter sufficiently small as to enter the bladder without more force than is desirable I contented myself in more completely pulverising the calculus with the lithotrite than I should otherwise have thought necessary to do. The débris was discharged in the natural course of micturition and the patient was practically well without any delay, as the urine was never even tinged with blood. Sir William Roberts was kind enough to examine the fragments of the calculus and reported that it consisted of uric acid with a coating of oxalates and weighed a little over five grains. A short time ago the patient would undoubtedly have been submitted to a more serious operation. I may incidentally mention that I reported¹⁸ a very similar case where I practised lithotripsy in a male child aged eleven years in 1881, and I have since from time to time successfully adopted this proceeding. I believe this was one of the first recorded examples in so young a subject, a circumstance I had forgotten until recently reminded of it by my friend Brigade-Surgeon-Lieutenant-Colonel Keegan. Some small lithotrites were then made for me by Messrs. Weiss, of which this is a specimen. I have not met with an instance of recurrence of stone after litholapaxy in children.

THE ROENTGEN RAYS IN CALCULOUS DISORDERS.

In bringing my observations to a conclusion I shall ask your indulgence for a few moments whilst I engage in some speculations in contra-distinction to the subject matter I have

¹⁸ Op. cit.

hitherto ventured to bring under your notice, in the belief that it has been sufficiently demonstrated as to warrant me in doing so. I refer to the application of the Roentgen or x rays to this branch of surgery. I feel that I am justified in doing so, partly for the reason that if these anticipations eventually fail to be realised they may still possibly serve to indicate in what directions assistance from collateral science is required and may be expected, and partly because Sir Joseph Lister (the distinguished President of the British Association) in his recent address in Liverpool emphasised the belief that in the near future surgery had much to gain by this method of investigation. As to the truth of the latter statement there can be no doubt. To what extent this means may be utilised in matters which have occupied a considerable portion of this lecture has yet to be demonstrated. In its application to the diagnosis of calculus situated within any portion of the male or female urinary apparatus from the kidney downwards I am not aware that it has been sufficiently successful in indicating either the form or position of the stone. From some experiments made chiefly outside the human body—I refer to such as those of M. d'Arsonval in Paris and Mr. Henry Morris¹⁹ and others—it is quite possible by the shadows thus cast to distinguish various kinds of calculi. At present I do not think more than this can be said or has been sufficiently demonstrated. Though I have had several patients skia-graphed I have not yet succeeded in obtaining results which were of help in making a diagnosis independently of such means as we are in the habit of using. In thus referring to this method of investigation it is with the hope that in its further development and application it will, amongst other aids, enable us to dispense with the use of the sound as a means of diagnosing stone in the bladder. I cannot recall an instance in the child, woman, or young adult extending up to what I would call middle age who was ever seriously damaged by the judicious use of this instrument, but in males of a more advanced age, where the prostate was large and access to the interior of the bladder, by means of a rigid instrument, by no means easy, we have seen, both where a stone had been discovered as well as where one had not, serious and even fatal consequences ensue. A cystitis, for instance, has thus been aroused with considerable general disturbance which has sometimes taken a long time to overcome, not to say anything of being the means of postponing a necessary operation indefinitely by reason of the acute septic conditions under which it would otherwise have been undertaken. Nor is this all. How few surgeons, in whatever degree they may be engaged in work of this kind, can feel that the skilful employment of the steel sound is an absolute guarantee against the possibility of a stone escaping their vigilance. When we look at the shape the diseased bladder and prostate often assume it is astonishing to me that this somewhat

¹⁹ THE LANCET, Nov. 14th, 1896.

primitive mode of examination so rarely fails us ; but it is in just this particular class of cases that we rely upon it most and where our disappointment is the keenest if it falls short of our expectation, whatever the explanation may be. Under these circumstances I have for some time past been in the habit of including under one process, with great advantage, the administration of an anæsthetic, the use of the sound for the first exploration of the bladder, and the immediate removal of the stone, by crushing if practicable, if one is discovered. Just as in earlier years a preliminary paracentesis of an ovarian tumour was often found to be an unfavourable antecedent to an ovariectomy, so may the passing and use of a sound be a preface, which we would avoid, to the subsequent removal of the stone, however this may be effected. No more desirable object can be wished for in connexion with the practical use of these rays than their adaptation to determining the presence, position, and constitution of the various stony concretions that have their habitat in the human urinary organs. I have some confidence in expressing the belief that the time is not far distant when, under the circumstances I have mentioned, these Roentgen rays will enable us to see the stone instead of feeling it, just as in a recorded case²⁰ where a Murphy's button, lost in a remote corner of the intestines, was thus found by my old friend and colleague, Mr. Mitchell Banks.

²⁰ Brit. Med. Jour., Oct. 24th, 1896.



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